Incremental Sampling Method for Defining the Land Use Control Boundary at a Shoreline Site with Fill Material

Presented By
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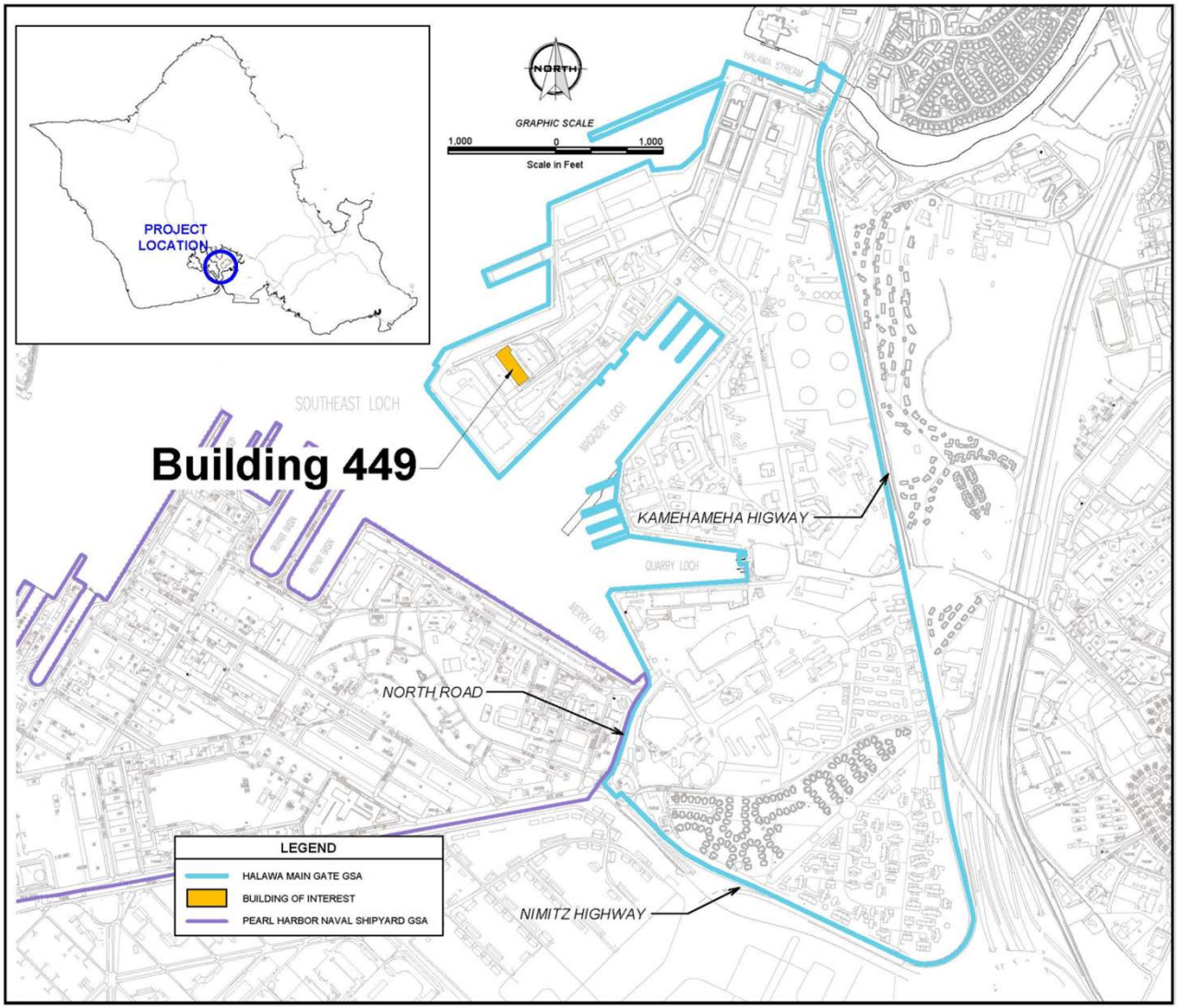
Objective

To share the potential benefit of using Incremental Sampling (IS) for the delineation of the Land Use Control Boundary for a Shoreline Site Where Fill Material is a Concern.

Installation Vicinity Map

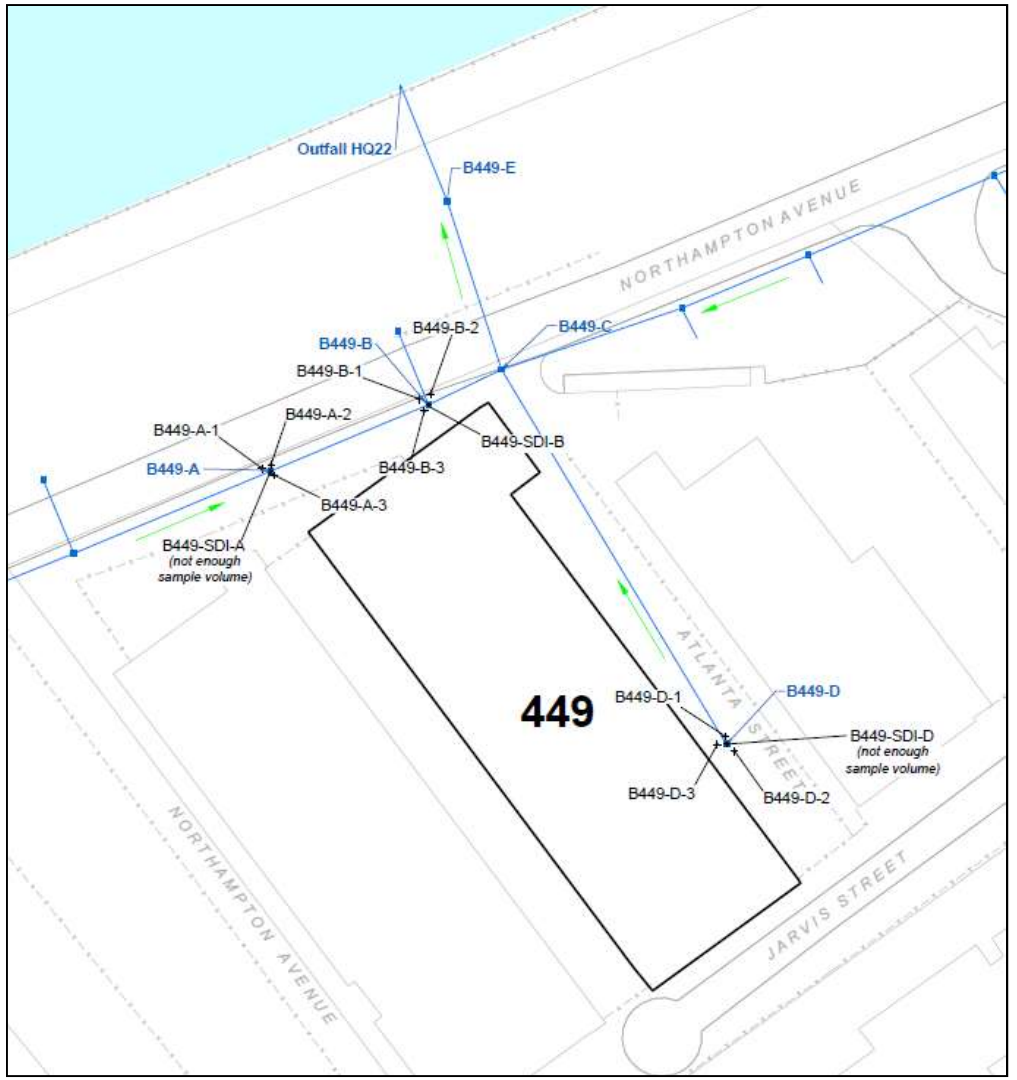


Site Background

- Constructed in 1942, used as a Naval Supply Center vehicle maintenance and machine shop.
- Contaminants in and around the storm drains were due to past work practices
- Building floor drain was connected to storm drain system
- Ground surface mostly covered with asphalt and concrete pavement
- Groundwater is non-potable

Previous Investigations

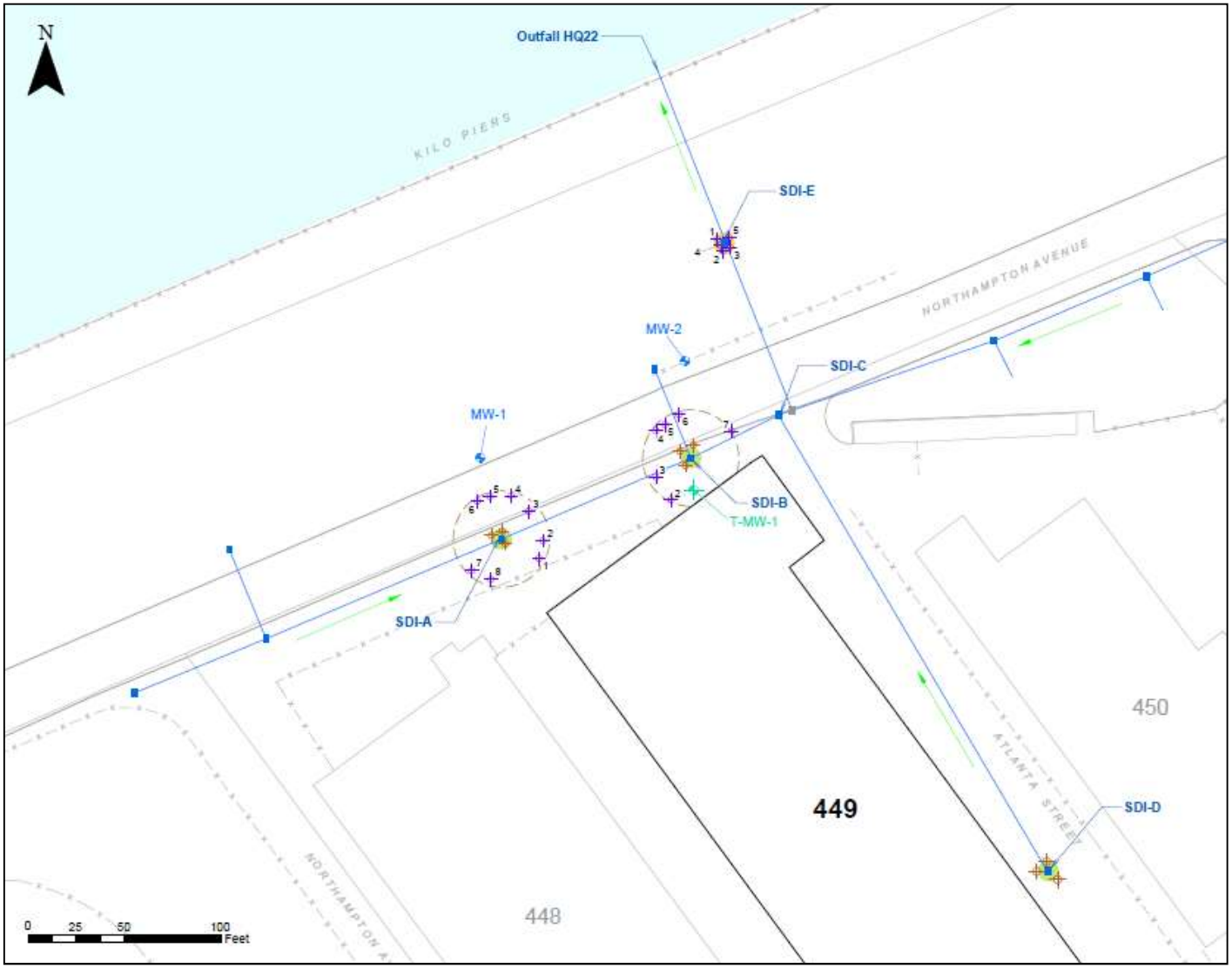
- **Site Inspection: (2006)**
- **Remedial Investigation: (2011-present):**
  - **Two Phases of RI sampling**
- **Media Evaluated:**
  - **Sediment in storm drains**
  - **Soil and groundwater near storm drain inlets**
- **3 MWs (one was temporary) and 40 borings where discrete soil samples were collected**
- **COPCs: TPHs, PAHs, PCBs, and metals**



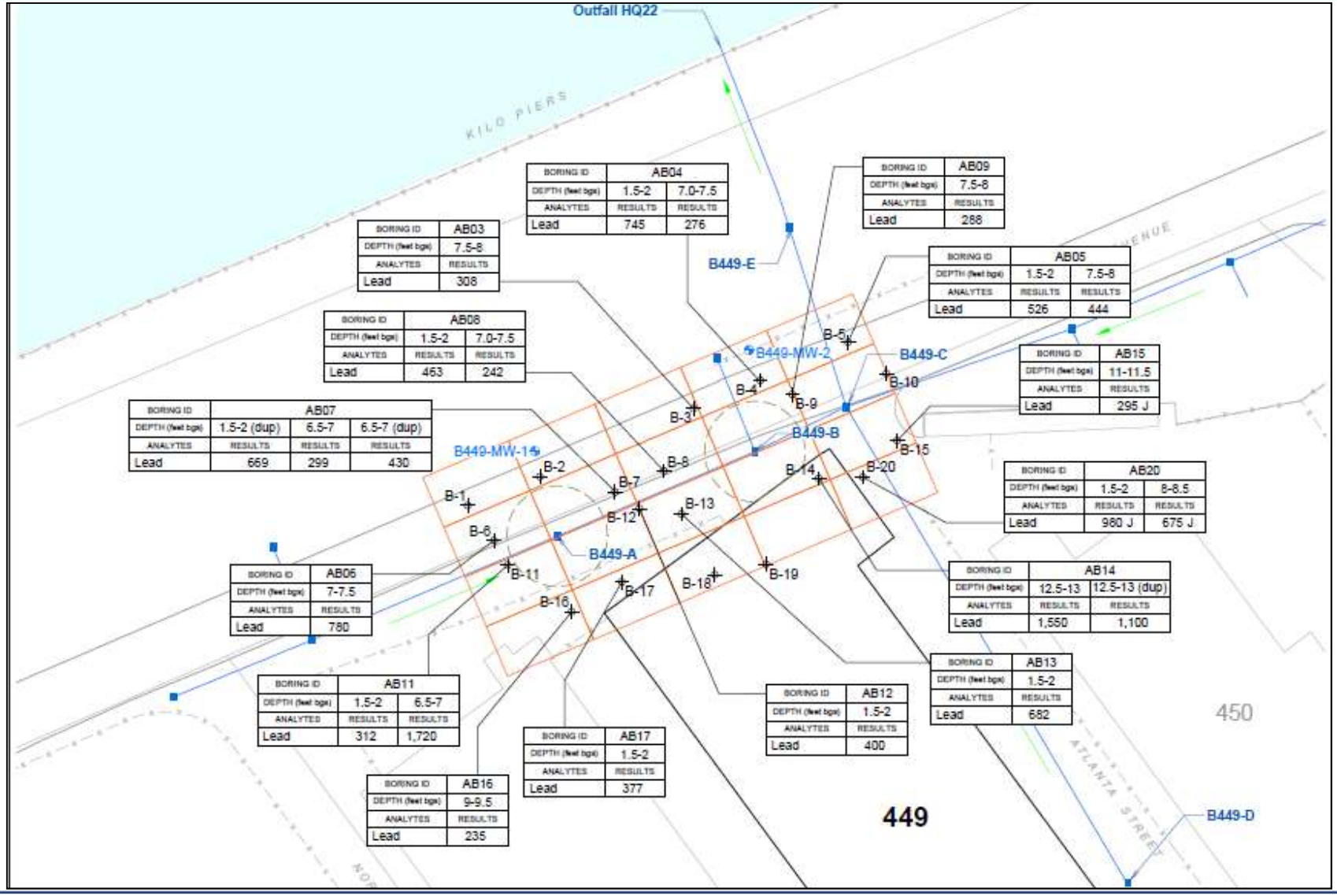
Extent of Contamination

- **Sediment in Storm Drains:**
  - **PCBs and PAHs were above Project Action Levels.**
  - **Non-Time Critical Removal Action completed in 2016.**
- **Soil:**
  - **Metals (i.e., lead, mercury and barium), PAHs and TPH-RRO were above Project Action Levels.**
  - **Additional delineation needed for lead.**
- **Groundwater:**
  - **No Further Action recommended.**

Phase I & II RI Sampling Locations



Additional Phase II RI Sampling



BORING ID	AB04	
DEPTH (feet bgs)	1.5-2	7.0-7.5
ANALYTES	RESULTS	RESULTS
Lead	745	276

BORING ID	AB09
DEPTH (feet bgs)	7.5-8
ANALYTES	RESULTS
Lead	288

BORING ID	AB03
DEPTH (feet bgs)	7.5-8
ANALYTES	RESULTS
Lead	308

BORING ID	AB05	
DEPTH (feet bgs)	1.5-2	7.5-8
ANALYTES	RESULTS	RESULTS
Lead	526	444

BORING ID	AB08	
DEPTH (feet bgs)	1.5-2	7.0-7.5
ANALYTES	RESULTS	RESULTS
Lead	463	242

BORING ID	AB15
DEPTH (feet bgs)	11-11.5
ANALYTES	RESULTS
Lead	295 J

BORING ID	AB07		
DEPTH (feet bgs)	1.5-2 (dup)	6.5-7	6.5-7 (dup)
ANALYTES	RESULTS	RESULTS	RESULTS
Lead	669	299	430

BORING ID	AB20	
DEPTH (feet bgs)	1.5-2	8-8.5
ANALYTES	RESULTS	RESULTS
Lead	980 J	675 J

BORING ID	AB06
DEPTH (feet bgs)	7-7.5
ANALYTES	RESULTS
Lead	780

BORING ID	AB14	
DEPTH (feet bgs)	12.5-13	12.5-13 (dup)
ANALYTES	RESULTS	RESULTS
Lead	1,550	1,100

BORING ID	AB13
DEPTH (feet bgs)	1.5-2
ANALYTES	RESULTS
Lead	682

BORING ID	AB11	
DEPTH (feet bgs)	1.5-2	6.5-7
ANALYTES	RESULTS	RESULTS
Lead	312	1,720

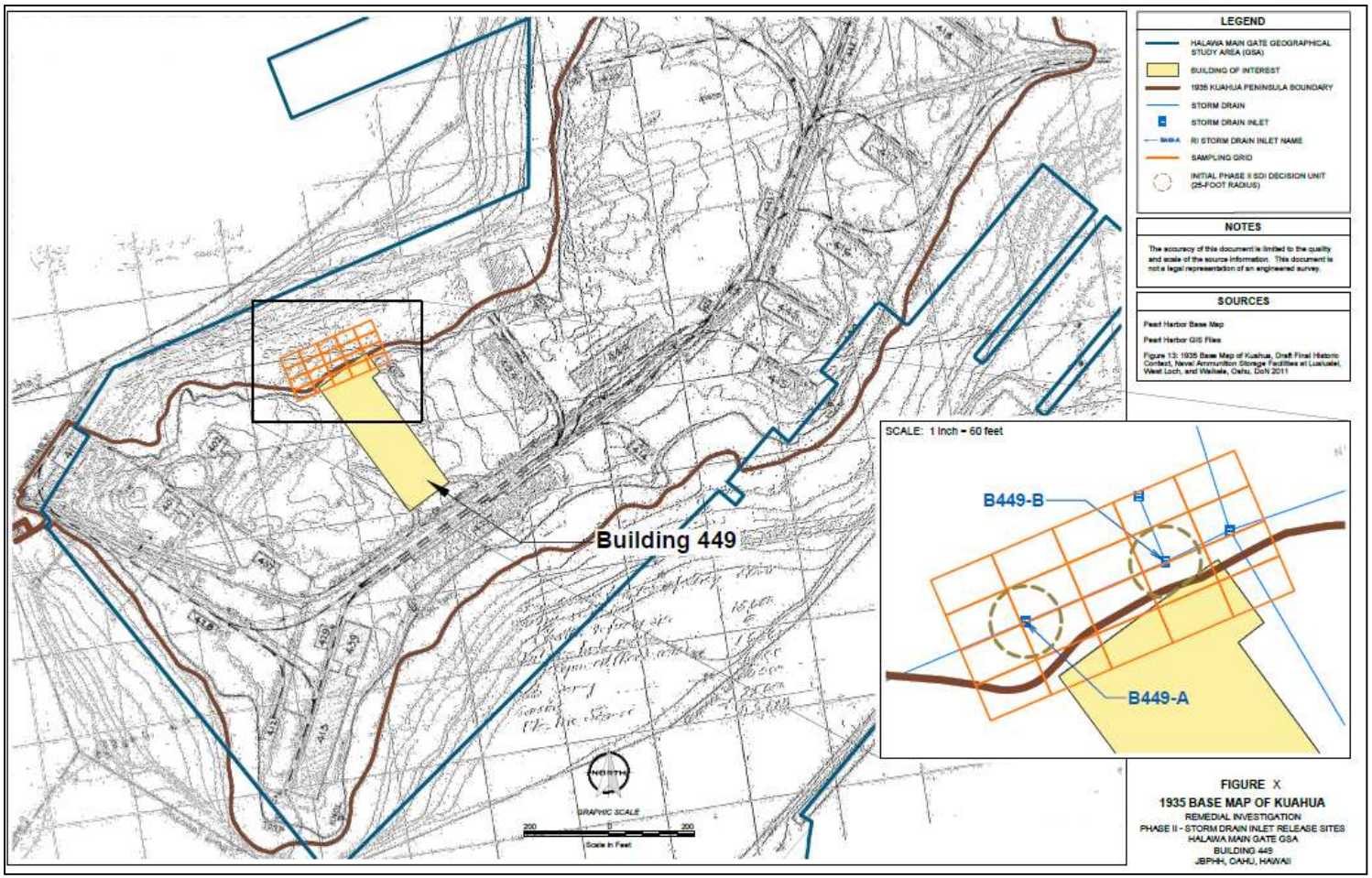
BORING ID	AB12
DEPTH (feet bgs)	1.5-2
ANALYTES	RESULTS
Lead	400

BORING ID	AB17
DEPTH (feet bgs)	1.5-2
ANALYTES	RESULTS
Lead	377

BORING ID	AB16
DEPTH (feet bgs)	9-9.5
ANALYTES	RESULTS
Lead	235

Shoreline (Historic and Present)

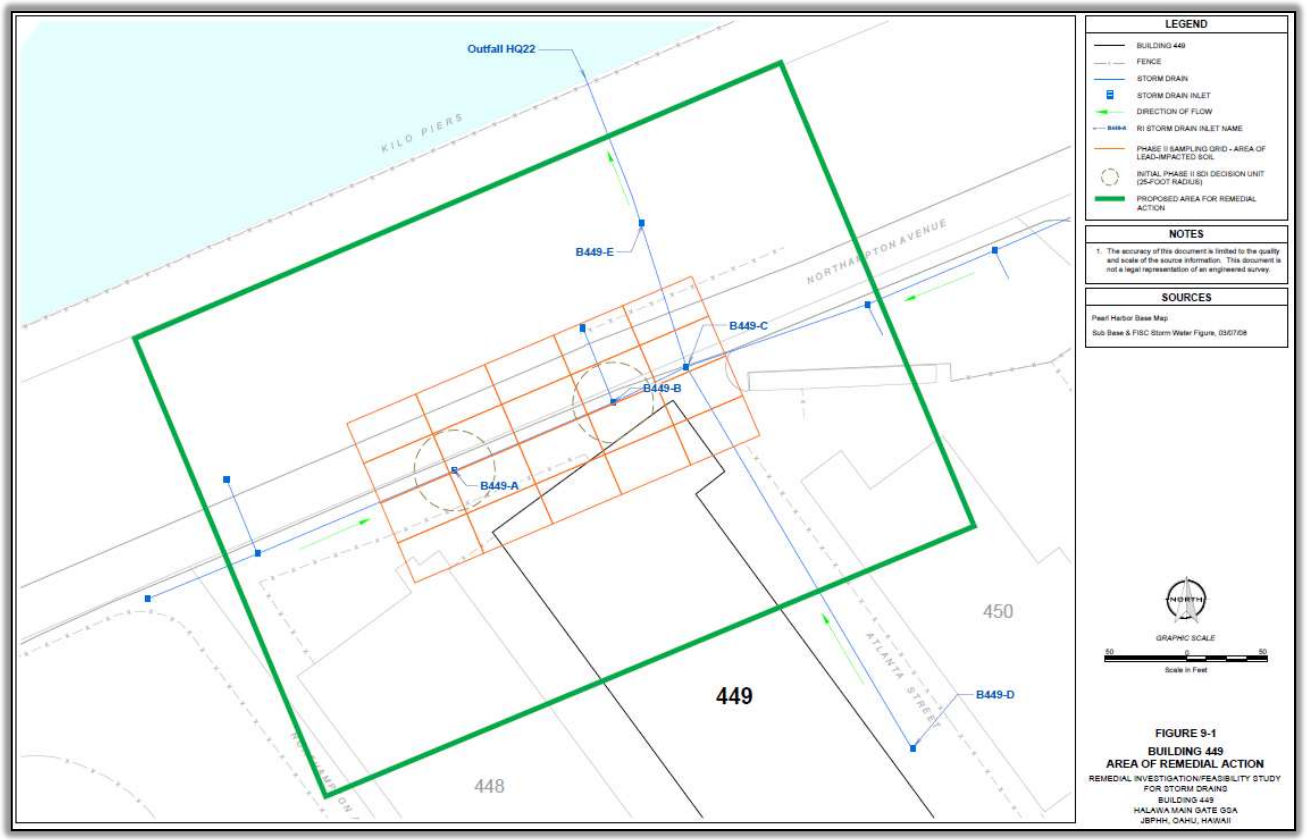
Building 449 Site superimposed on the figure showing the historic (brown line) and present (blue line) shoreline.



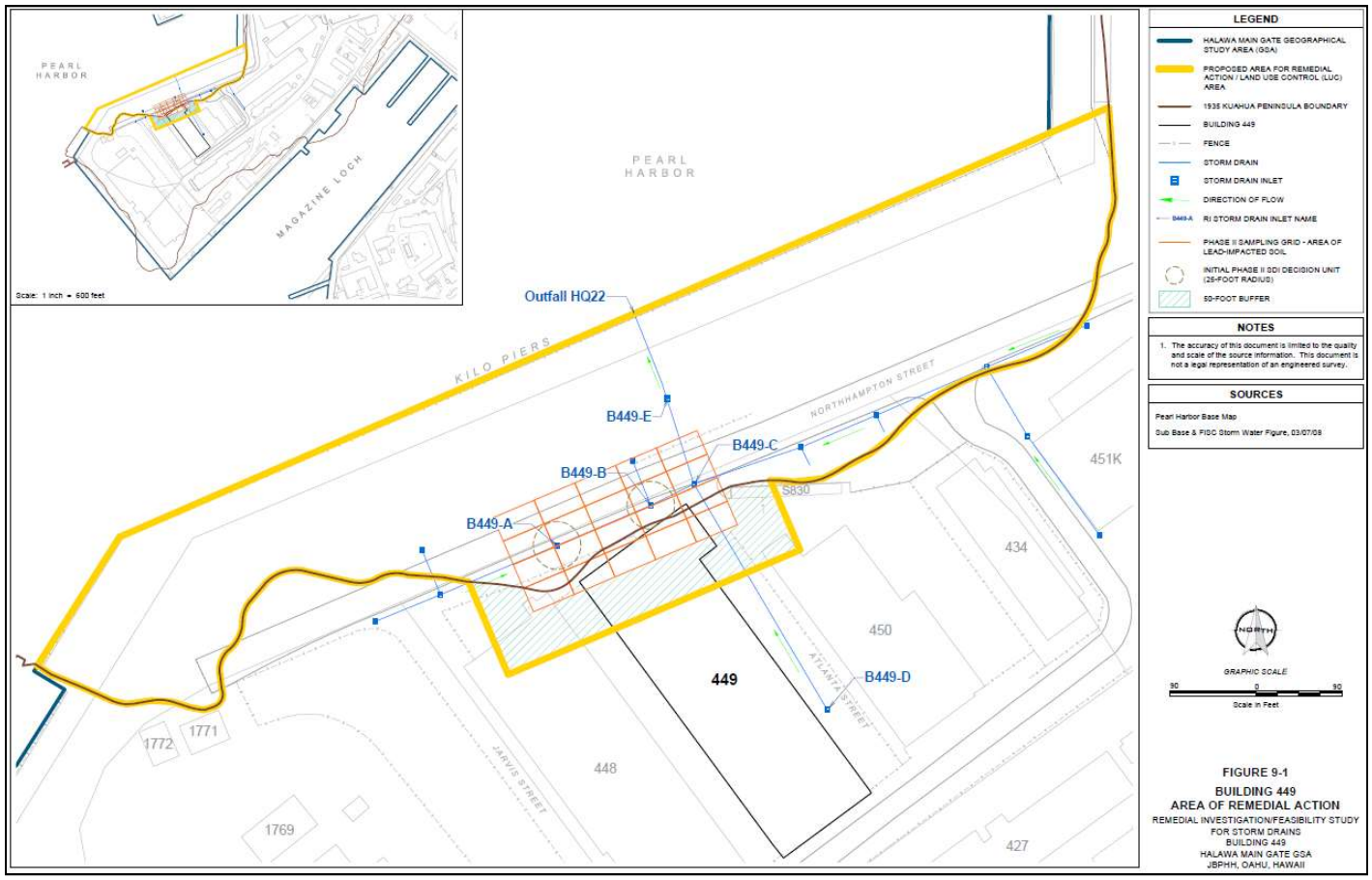
Draft FS Recommended Alternative

- **Capping with LUCs is the recommended response action for the lead-impacted soil around Storm Drain Inlets B449-A and B449-B.**

- **This LUC boundary (in green) was based on sample data to-date and a 100 ft. distance around the known area of contamination.**



LUC Boundary Per EPA Comment



The LUC boundary shown in yellow, approx. 6.2 acres.

Lead Detection To-Date

Figure 1
Maximum Lead Concentrations
Building 449 RI Addendum
Soil Sampling for Lead,
Pearl Harbor Naval Complex,
Oahu, Hawaii

Use of Incremental Sampling (IS)

- IS methodology can provide reliable, reproducible sampling results and leads to better, more defensible decisions than have typically been achieved with traditional sampling approaches. (ITRC 2012)

- To-date only discrete soil samples have been collected.

Incremental Sampling Procedure

- Determine area and number of Decision Units (DUs) needed. Input needed from regulatory agencies.

- Systematic random collection of 30 to 50 plus increments for each DU. To make up one sample that will be analyzed at the laboratory.

- Analytical laboratory needs to have the capability to prepare the sample.

Knowledge Check

- What is the area that the Incremental Sample result (i.e., soil concentration) represents called?

- How many increments are collected to make up the sample to be shipped to the analytical laboratory?

- What kind of sampling method has been performed to-date?

Proposed Incremental Samples

- Incremental sampling (IS) may be able to delineate the extent of the lead contamination and define the LUC boundary.
- IS soil results could determine LUC boundary to be not more than 1.5 to 2.0 acres.

Summary

Key Take Away Messages

- Utilize all available techniques or methods to delineate LUC boundaries.
- Consider the use of Incremental Sampling to delineate LUC boundary.
- Include regulators in discussion to ensure acceptance of Incremental Sampling to define LUC boundary.

Contacts and Questions

Points of Contact

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Questions ?